UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

OFFICE OF
CHEMICAL SAFETY AND
POLLUTION PREVENTION

MEMORANDUM:

To: Clayton Myers, RM Reviewer

From: Clayton Myers, Entomologist **Date**: July 16, 2012

7-16-12

Subject: PRODUCT PERFORMANCE DATA EVALUATION RECORD

DP barcode:	400663
Decision no.:	459858
Submission no:	910069
Action code:	R310
Product Name:	TC-335
EPA Reg. No or File Symbol:	499-LAG
Formulation Type:	RTU Pressurized Foam

Ingredients statement from the label with PC codes included: Fipronil, 0.005%, PC: 129121

Application rate(s) of product and each active ingredient (lbs. or gallons/1000 square feet or per acre as appropriate; and g/m^2 or mg/cm^2 as appropriate): For use in galleries and wall voids and outdoor crack and crevice application against termites and other wood destroying pests—dispersal of 1-8 seconds depending upon the size of the void/area. Foam expands at a ratio of 30:1, with 1 oz of product (5 seconds of application) producing approximately 1 qt of foam.

I. Action Requested: Data was submitted to support claims against various termite species for a new product. aeorsol foam formulation of fipronil, for use in voids and insect galleries.

II. Background: The registrant seeks to register a new fipronil (foam aerosol) product, to be applied as a RTU aerosol with a B&G nozzle/foaming attachment, for use in wall voids, insect galleries, and other unexposed voids/surfaces within trees, outdoor structures, and transport equipment infested by termites. The registrant has submitted data in support of claims against Arboreal, Drywood, and Subterranean (*Coptotermes, Reticulitermes, Heterotermes, and Zootermopsis*) termite species and also Carpenter Ants.

III. MRID Summaries: (Primary Reviews attached)

a. MRID 48680902

(1) Non-GLP

(2) A laboratory study was conducted to evaluate the efficacy of 3 fipronil RTU products (a 0.005% dust, a 0.5% dust, and a 0.005% foam) and an untreated control against Formosan subterranean termites, *Coptotermes formosanus*. For each treatment 5 replicates (40 termites each) of petri dishes were used for the evaluations. Petri dishes were paired with connective tubing, where one dish was to be treated and the other untreated. Both dishes were provisioned with filter paper and water to maintain the termites. One side was treated through a sealed hole in the lid, with a 1 second burst of product, as described on the label. Prior to release of termites, tubing was sealed to prevent contamination of the connecting tube or the other untreated dish. For untreated controls, both dishes were untreated. After treatment, dishes were kept in a fume hood

for 24 hours to dry. Filter paper was moistened for termite placement, and then 40 worker termites were placed in the center of each untreated dish. Dishes were maintained in an incubator and monitored for termite location and mortality, with moisture being replenished as needed. Location assessments were done at 2, 4h and 1, 2, 3, and 5 days after treatment. Mortality assessments were done at 1, 2, 3, 5, 7, and 10 days after treatment. Mean mortality and intoxication were recorded.
(3) Authors conclude that mortality was 95.0% at 2 days, 97.5% at 3 days, and 100% thereafter for the 0.005% fipronil foam formulation.
(4) The primary reviewer correctly indicated that Abbott's formula was not properly applied to the data and that the 4.5% mortality observed in the control at day 2 leads to the the corrected mortality for the product being 95%. Data are adequate to support formosan termite claims as listed on the submitted product label. This study is rated as partially acceptable and the killing/control claims are supported for Formosan termites.

b. MRID 48680903

(1) Non-GLP
(2) A laboratory choice study was conducted to evaluate the efficacy of 3 fipronil RTU products (a 0.005% dust, a 0.5% dust, and a 0.005% foam) and an untreated control against Eastern subterranean termites, *Reticulitermes flavipes*. For each treatment 5 replicates (40 termites each) of petri dishes were used for the evaluations. Petri dishes were paired with connective tubing, where one dish was to be treated and the other untreated. Both dishes were provisioned with filter paper and water to maintain the termites. One side was treated through a sealed hole in the lid, with a 1 second burst of product, as described on the label. Prior to release of termites, tubing was sealed to prevent contamination of the connecting tube or the other untreated dish. For untreated controls, both dishes were untreated. After treatment, dishes were kept in a fume hood for 24 hours to dry. Filter paper was moistened for termite placement, and then 40 worker termites were placed in the center of each untreated dish. Dishes were maintained in an incubator and monitored for termite location and mortality, with moisture being replenished as needed. Location assessments were done at 2, 4h and 1, 2, 3, and 5 days after treatment. Mortality assessments were done at 1, 2, 3, 5, 7, and 10 days after treatment. Mean mortality and intoxication were recorded.
(3) Authors conclude that mortality was 94.0% at 3 days, 95.5% at 7 days, and 100% at 10 days for the 0.005% fipronil foam formulation.
(4) The primary reviewer correctly indicated that Abbott's formula was not properly applied to the data and that with the 7.5% mortality observed in the control at day 3, leading to the the corrected mortality for the product being 93.5% for day 3. Thus, the data are adequate to support eastern subterranean termite claims as listed on the submitted product label.

c. MRID 48680905

(1) Non-GLP
(2) A laboratory study was conducted to evaluate the efficacy of 3 fipronil RTU products (a 0.005% dust, a 0.5% dust, and a 0.005% foam) and untreated controls against Eastern subterranean termites, *Reticulitermes flavipes*. For each treatment 5 replicates (40 termites each) of petri dishes were used for the evaluations. Dishes were provisioned with filter paper and water to maintain the termites. Treatments were applied from 12 inches above for approximately l second. After treatment, dishes were kept in a fume hood for 48 hours to dry. Filter paper was moistened for termite placement, and then 40 worker termites were placed in the center of each dish. Dishes were maintained in an incubator and monitored for termite location and mortality, with moisture being replenished as needed. Mortality assessments were done at 1, 2, 4, 8, 24, and 72 hours after treatment. Mean mortality and intoxication were recorded.
(3) Authors conclude that mortality was 100% at 4 h, for the 0.005% fipronil foam formulation.
(4) The primary reviewer correctly indicated that Abbott's formula was not properly applied to the data and that the 4.5% mortality observed in the control at 4 h leads to the the corrected mortality for the product being less than 100%, but still greater than 90%. The data are adequate to support Eastern subterranean termite claims as listed on the submitted product label. Killing/control

claims are supported for Eastern subterranean termites.

d. MRID 48680906

(1) Non-GLP

(2) A laboratory study was conducted to evaluate the efficacy of 3 fipronil RTU products (a 0.005% dust, a 0.5% dust, and a 0.005% foam) and untreated controls against Formosan subterranean termites, *Coptotermes formosanus*. For each treatment 5 replicates (40 termites each) of petri dishes were used for the evaluations. Dishes were provisioned with filter paper and water to maintain the termites. Treatments were applied from 12 inches above for approximately l second. After treatment, dishes were kept in a fume hood for 48 hours to dry. Filter paper was moistened for termite placement, and then 40 worker termites were placed in the center of each dish. Dishes were maintained in an incubator and monitored for termite location and mortality, with moisture being replenished as needed. Mortality assessments were done at 1, 2, 4, 8, 24, and 72 hours after treatment. Mean mortality and intoxication were recorded.

(3) Authors conclude that mortality was 92.0% at 4 h, 99.0% at 8 h, and 100% thereafter for the 0.005% fipronil foam formulation.

(4) The primary reviewer correctly indicated that Abbott's formula was not properly applied to the data and that the 2% mortality observed in the control at 4 h leads to the the corrected mortality for the product being less than 100%, but still greater than 90%. The data are adequate to support formosan termite claims as listed on the submitted product label. Killing/control claims are supported for Formosan termites.

e. MRID 48681002

(1) Non-GLP

(2) A laboratory study was conducted to evaluate the efficacy of a fipronil foam product (0.005%) against Carpenter Ants, *Camponotus modoc*. Wood substrates were cut into blocks approximately 13 x 11 x 1.75 cm in size. Substrates were treated with foam on both sides with air drying between each treatment. After drying, blocks were placed into rearing chambers that were provisioned with water and honey for ants. 40% of container lids were removed for ventillation. A mixture of mineral oil and petroleum jelly was applied to the undersides of lids to prevent ants from escaping. Control blocks were treated with water only. There were 5 replicates for each treatment with 50 ants placed per replicate. 2 substrates were placed in each chamber, one treated, one untreated (or both untreated for the control). Ants were introduced after 24 hours and mortality was assessed at 1, 2, 4, 8, and 24 h, and daily through 14 days. Mean mortality was calculated.

(3) Authors conclude that mortality was 91% at 2 days, and 100% thereafter for the 0.005% test formulation.

(4) The primary reviewer correctly indicated that Abbott's formula was not properly applied to the data and that the 5% mortality observed in the control at 2 d leads to the the corrected mortality for the product being 90.5%. The data are adequate to support Carpenter Ant claims as listed on the submitted product label. Killing/control claims are supported for Carpenter Ants.

f. MRID 48681003

(1) Non-GLP

(2) A laboratory study was conducted to evaluate the efficacy of a fipronil foam product (0.005%) against Carpenter Ants, *Camponotus pennsylvanicus*. Artificial carpenter ant nests were constructed from pine 2 x 8" boards. Each nest was a 10" long piece of wood with parallel, ½" diameter holes drilled lengthwise into the board, but ending just before breaking through the back of the board. To connect these 2 parallel galleries, a 3rd hold was drilled from one side of the board to the other, perpendicular to and acros the path of the parallel galleries. The board was then cut lengthwise down the center, resulting in 2 galleried pieces of wood that mirrored one another. Half of each block was treated with enough foam to completely coat the inside of all galleries, with the other half left untreated. After drying (24 h) making tape was placed on all outside surfaces. Treated and untreated pairs were put back together on the floor of a Fluon lined

plastic box, with 20 carpenter ants added to each box (5 replicates per treatment). After 48 h, and mortality inside and outside of each block was determined.
(3) Authors conclude that mortality was 97% at 2 days, for the 0.005% test formulation.
(4) The primary reviewer correctly indicated that Abbott's formula was not properly applied to the data and that the 2% mortality observed in the control at 2 d leads to the the corrected mortality for the product being higher than 90% but less than 100%. The data are adequate to support Carpenter Ant claims as listed on the submitted product label. Killing/control claims are supported for Carpenter Ants.

IV. RECOMMENDATIONS:

(1) Labeling:

(a) What pests and site/pest combinations may be added as follows to the label based on the submitted or cited data?

Termites (including arboreal, drywood, and subterranean), Carpenter Ants

(b) What pests and site/pest combinations must be removed from the label?

None

(c) List changes to the directions for use:

None

(d) List changes to the optional marketing claims:

Not Applicable, as no marketing claims were present

TASK 2 DATA EVALUATION RECORD

STUDY TYPE: Product Performance

MRID 486809-02. Jones, C.E. 2011. Bioactivity of Termidor Dry Pressurized (TC-311, 0.005% Fipronil), Termidor Dry (TC-328, BAS 350 HJ I, 0.5% Fipronil) and Termidor Foam (TC-335, 0.005% Fipronil) Against Formosan Subterranean Termites (*Coptotermes formosanus*) Via Indirect Contact Assays (DIMeS 1887b).

OCSPP 810.3500 [Premises Treatments]
OCSPP 810.3600 [Structural Treatments]

Product Name: TC-311

EPA Reg. No.: 499-LAU

Decision number: 459860

DP number: 400655

Prepared for
Registration Division (7505)
Office of Pesticide Programs
U.S. Environmental Protection Agency
Washington, DC 20460

Prepared by
Summitec Corporation
Task Order No.: 2-61

Primary Reviewer:
Dennis M. Opresko, Ph.D.

Signature: [signature]
Date: JUL 10 2012

Secondary Reviewers:
Robert Ross, M.S.

Signature: Robert W. Ross
Date: JUL 10 2012

Robert H. Ross, M.S. Program Manager

Signature: Robert W. Ross
Date: JUL 10 2012

Quality Assurance:
Angela Edmonds, B.S.

Signature: Angela Edmonds
Date: JUL 10 2012

Disclaimer

This review may have been altered subsequent to the contractors' signatures above.
Summitec Corp. for the U.S. Environmental Protection Agency under Contract No. EP-W-11-014

DATA EVALUATION RECORD

[EPA Primary Reviewer's Name]

STUDY TYPE:	PRODUCT PERFORMANCE [OCSPP 810.3500; 810.3600]
MRID:	486809-02. Bioactivity of Termidor Dry Pressurized (TC-311, 0.005% Fipronil), Termidor Dry (TC-328, BAS 350 HJ I, 0.5% Fipronil) and Termidor Foam (TC-335, 0.005% Fipronil) Against Formosan Subterranean Termites (*Coptotermes formosanus*) Via Indirect Contact Assays (DIMeS 1887b). Jones, C.E. 2011.
DP BARCODE:	400655
DECISION NO:	459860
SUBMISSION NO:	910076
SPONSOR:	BASF Corporation.
TESTING FACILITY:	APR/IB Advanced Testing II, Non-crop.
STUDY DIRECTOR:	S. Thompson, Ph.D., APR/IB Advanced Testing II, Non-crop.
SUBMITTER:	D.M. Thomas, BASF Corporation
STUDY COMPLETED:	06/10/2011
CONFIDENTIALITY CLAIMS:	None
GOOD LABORATORY PRACTICE:	"This study was not conducted in compliance with Good Laboratory Practice standards as described by EPA (40 CFR Parts 160 and 792), and was never intended for that purpose."
TEST MATERIAL:	PRODUCT NAME: TC-311 EPA REGISTRATION NUMBER: 499-LAU ACTIVE INGREDIENT NAME: Fipronil CHEMICAL NAME: [5-amino-1-(2,6-dichloro-4-(trifluoromethyl)phenyl)-4-((1,R,S)-(trifluoromethyl)sulfinyl)-1-H-pyrazole-3-carbonitrile] A.I. %: 0.005%

PC CODE: 129121
CAS NO.: 120068-37-3
FORMULATION TYPE: Dry pressurized insecticide.
PRODUCT APPLICATION RATE(S): Not quantified.
ACTIVE INGREDIENT APPLICATION RATE(S): Not reported.

PROPOSED LABEL MARKETING CLAIMS: "Kills termites (including subterranean, drywood, dampwood, and arboreal)…"

STUDY REVIEW

Purpose: To evaluate the efficacy of Termidor® Dry Pressurized (TC-311, 0.005% Fipronil), Termidor Dry (TC-328, BAS 350 HJ I, 0.5% Fipronil) and Termidor Foam (TC-335, 0.005% Fipronil) against Formosan subterranean termites (*Coptotermes formosanus*) via indirect contact assays.

MATERIALS AND METHODS

Test Location: Not reported.

Test Material(s): Termidor® foam (TC-335; 0.005% fipronil), Termidor® Dry (TC-328, 0.5% fipronil); Termidor® Dry Pressurized insecticide (TC-311, 0.005%). TC-311 is identical to the substance listed under EPA Reg. No. 499-LAU.

Test Species Name, Life Stage, Sex and Age: Formosan subterranean termites (*Coptotermes formosanus*)

Describe test containers, chambers and/or apparatus (include site description and location) and how experiment was conducted: A single hole (0.75 cm in diameter) was drilled into the sides of two Petri dishes (100 x 20 mm). Sections of clear Tygon® tubing were inserted into the holes connecting the two dishes linearly and secured in place with silicone adhesive. The entrance to the tubing on the dish to be treated was sealed with tape. Both Petri dishes were supplied with filter paper as a substrate for the termites. TC-311 was applied evenly using a crack and crevice adaptor from approximately 12 inches above, spraying for 1 second. The dishes were weighed before and after treatment. After treatment the lids were replaced and the covered Petri dishes were kept in a fume hood at ambient laboratory temperatures for 24 hr. After 24 hr, the lids were removed and the treatments were allowed to dry for at least an additional 24 hr. After drying, the tape was removed from the hole in the treated dishes, and the filter paper was moistened. Forty worker termites (beyond third instar) were placed in the center of each untreated dish. Dishes were maintained at 26°C and ca. 80% RH in a darkened incubator, except during evaluations. Moisture was replenished as needed. Location of the termites was assessed at 2 and 4 hr as well as 1, 2, 3, and 5 days. Mortality and intoxication were assessed at 1, 2, 3, 5, 7 and 10 days.

List the treatments including untreated control: Average amount of TC-311 dispensed per dish across the 5 replicates was 0.31 g. Controls were untreated.

Number of replicates per treatment: 5.

Number of individuals per replicate: 40.

Length of exposure to treatment: Variable.

Were tested specimens transferred to clean containers? No.

Experimental conditions: 26°C and 80% RH in a darkened incubator.

Data or endpoints collected/recorded: Location of termites and number of dead and intoxicated.

Data analysis: Mean percent mortality and mean percent intoxicated. No other data analysis.

RESULTS

Replicate data are included in the study report. There was no mention of protocol amendments or deviations. Data were not corrected using Abbott's Formula. Summary results for Termidor® Dry pressurized insecticide (TC-311; label formulation) are shown in Table 1, together with the results for the other materials tested and the controls.

Table 1. Bioactivity of Termidor Dry and Foam Formulations on Subterranean Termites (C. formosanus).

Treatment	% fipronil	Mean % mortality/intoxication days after exposure											
		1		2		3		5		7		10	
		d-m	intox	d-m	intox	d-m	intox	d-m	intox	d-m	intox	d-m	intox
Termidor Dry pressurized TC-311	0.005	36.5	0.0	48.5	0.0	53.5	0.0	83.0	0.0	86.5	0.0	90.0	0.0
Termidor Dry TC 328	0.5	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0
Termidor Foam TC 335	0.005	79.0	0.0	95.0	0.0	97.5	0.0	100.0	0.0	100.0	0.0	100.0	0.0
UTC	-	1.5	0.0	4.5	0.0	7.5	0.0	7.5	0.0	7.5	0.0	8.5	0.0

Bioassays initiated 26 September 2011

Water not easily absorbed by filter paper

[1] Means based on 5 replicates per treatment

[2] Formula code 237- 036; Lab code 237-051; BAS 350 HKI: 0.005% fipronil

[3] Formula and Lab code 237-056; BAS 350 HJI: 0.5% fipronil

[4] Formula and Lab code 237-048; BAS 350 HLI, 0.005% fipronil

NOTE: Intoxification was not defined by the study authors.

STUDY AUTHOR'S CONCLUSIONS

Mortality of Formosan termites exposed indirectly to TC-311 was 90% by Day 10.

REVIEWER'S CONCLUSIONS

Control mortality was 8.5% at Day 10, and mortality of termites indirectly exposed to TC-311 was 90% by Day 2. Using Abbott's Formula, mean percent mortality of the treated group on Day 10, corrected for control mortality is:

$$\frac{90\% \text{ (treated)} - 8.5\% \text{ (control mortality)}}{[100 - 8.5\% \text{ (control mortality)}]} \times 100 = 89\%$$

The resulting 10-day mean percent mortality of the TC-311 groups falls below the acceptable minimum of 90%.

REVIEWER'S RECOMMENDATIONS

Unacceptable; does not support the label claim that the product kills termites.

TASK 2 DATA EVALUATION RECORD

STUDY TYPE: Product Performance

MRID 486809-03. Jones, C.E. 2011. Bioactivity of Termidor Dry Pressurized (TC-311, 0.005% Fipronil), Termidor Dry (TC-328, BAS 350 HJ I, 0.5% Fipronil) and Termidor Foam (TC-335, 0.005% Fipronil) Against Eastern Subterranean Termites (*Reticulitermes flavipes*) Via Indirect Contact Assays (DIMeS 1887a).

OCSPP 810.3500 [Premises Treatments]
OCSPP 810.3600 [Structural Treatments]

Product Name: TC-311

EPA Reg. No.: 499-LAU

Decision number: 459860

DP number: 400655

Prepared for
Registration Division (7505)
Office of Pesticide Programs
U.S. Environmental Protection Agency
Washington, DC 20460

Prepared by
Summitec Corporation
Task Order No.: 2-61

Primary Reviewer:
Dennis M. Opresko, Ph.D.

Signature: [signature]
Date: JUL 10 2012

Secondary Reviewers:
Robert Ross, M.S.

Signature: Robert H. Ross
Date: JUL 10 2012

Robert H. Ross, M.S. Program Manager

Signature: Robert H. Ross
Date: JUL 10 2012

Quality Assurance:
Angela Edmonds, B.S.

Signature: Angela Edmonds
Date: JUL 10 2012

Disclaimer

This review may have been altered subsequent to the contractors' signatures above.
Summitec Corp. for the U.S. Environmental Protection Agency under Contract No. EP-W-11-014

DATA EVALUATION RECORD

[EPA Primary Reviewer's Name]

STUDY TYPE:	PRODUCT PERFORMANCE [OCSPP 810.3500; 810.3600]
MRID:	486809-03. Bioactivity of Termidor Dry Pressurized (TC-311, 0.005% Fipronil), Termidor Dry (TC-328, BAS 350 HJ I, 0.5% Fipronil) and Termidor Foam (TC-335, 0.005% Fipronil) Against Eastern Subterranean Termites (*Reticulitermes flavipes*) Via Indirect Contact Assays (DIMeS 1887a). Jones, C.E. 2011.
DP BARCODE:	400655
DECISION NO:	459860
SUBMISSION NO:	910076
SPONSOR:	BASF Corporation.
TESTING FACILITY:	APR/IB Advanced Testing II, Non-crop.
STUDY DIRECTOR:	S. Thompson, Ph.D., APR/IB Advanced Testing II, Non-crop.
SUBMITTER:	D.M. Thomas, BASF Corporation
STUDY COMPLETED:	06/10/2011
CONFIDENTIALITY CLAIMS:	None
GOOD LABORATORY PRACTICE:	"This study was not conducted in compliance with Good Laboratory Practice standards as described by EPA (40 CFR Parts 160 and 792), and was never intended for that purpose."
TEST MATERIAL:	PRODUCT NAME: TC-311 EPA REGISTRATION NUMBER: 499-LAU ACTIVE INGREDIENT NAME: Fipronil CHEMICAL NAME: [5-amino-1-(2,6-dichloro-4-(trifluoromethyl)phenyl)-4-((1,R,S)-(trifluoromethyl)sulfinyl)-1-H-pyrazole-3-carbonitrile] A.I. %: 0.005% PC CODE: 129121

CAS NO.: 120068-37-3
FORMULATION TYPE: Dry pressurized insecticide.
PRODUCT APPLICATION RATE(S): Not quantified.
ACTIVE INGREDIENT APPLICATION RATE(S)g/m^2: Not reported

PROPOSED LABEL MARKETING CLAIMS: "Kills termites (including subterranean, drywood, dampwood, and arboreal)…"

STUDY REVIEW

Purpose: To evaluate the efficacy of Termidor® Dry Pressurized (TC-311, 0.005% Fipronil), Termidor® Dry (TC-328, BAS 350 HJ I, 0.5% Fipronil) and Termidor® Foam (TC-335, 0.005% Fipronil) against eastern subterranean termites (*Reticulitermes flavipes*) via indirect contact assays.

MATERIALS AND METHODS

Test Location: Not reported.

Test Material(s): Termidor® foam (TC-335; 0.005% fipronil); Termidor® Dry (TC-328, 0.5% fipronil); Termidor® Dry Pressurized insecticide (TC-311, 0.005%). Termidor® Dry Pressurized insecticide (TC-311) is identical to the substance listed under EPA Reg. No. 499-LAU.

Test Species Name, Life Stage, Sex and Age: Eastern subterranean termites (*Reticulitermes flavipes*), workers (beyond third instar).

Describe test containers, chambers and/or apparatus (include site description and location) and how experiment was conducted: A single hole (0.75 cm in diameter) was drilled into the sides of two Petri dishes (100 x 20 mm). Sections of clear Tygon® tubing were inserted into the holes connecting the two dishes linearly and secured in place with silicone adhesive. The entrance to the tubing on the dish to be treated was sealed with tape. Both Petri dishes were supplied with filter paper discs as a substrate for the termites. TC-311 was applied evenly, using a crack and crevice adaptor from approximately 12 inches above, spraying for 1 second. The dishes were weighed before and after treatment. After treatment, the lids were replaced and the covered Petri dishes were kept in a fume hood at ambient laboratory temperatures for 24 hr. After 24 hr, the lids were removed and the treatments were allowed to dry for at least an additional 24 hr. After drying, the tape was removed from the hole in the treated dishes, and the filter paper was moistened. Forty worker termites (beyond third instar) were placed in the center of each untreated dish. Dishes were maintained at 26°C and ca. 80% RH in a darkened incubator, except during evaluation. Moisture was replenished as needed. Location of the termites was assessed at 2 and 4 hr as well as 1, 2, 3, and 5 days. Mortality and intoxication were assessed at 1, 2, 3, 5, 7 and 10 days.

List the treatments including untreated control (express application rate as g/m^2): Average amount of TC-311 dispensed per dish across the 5 replicates was 0.38 g. Controls were untreated.

Number of replicates per treatment: 5.

Number of individuals per replicate: 40.

Length of exposure to treatment: Variable.

Were tested specimens transferred to clean containers? No.

Experimental conditions: 26°C and 80% RH in a darkened incubator.

Data or endpoints collected/recorded: Location of termites and number of dead and intoxicated.

Data analysis: Mean percent mortality and mean percent intoxicated. (NOTE: Intoxification was not defined). No other data analysis.

RESULTS

Replicate data are included in the study report. There was no mention of protocol amendments or deviations. Data were not corrected using Abbott's Formula. Summary results for Termidor® dry pressurized insecticide (TC-311; label formulation) are shown in Table 1, together with the results for the other materials tested and the controls.

Table 1. Bioactivity of Termidor Dry and Foam Formulations on Subterranean Termites (*R. flavipes*).

		Mean % mortality/intoxication days after exposure											
	%	1		2		3		5		7		10	
Treatment	fipronil	d-m	intox	d-m	intox	d-m	intox	d-m	intox	d-m	intox	d-m	intox
[redacted]	0.005	69.0	0.0	80.0	0.0	88.0	0.0	93.5	0.0	96.0	0.0	100.0	0.0
Termidor Dry TC 328	0.5	77.0	0.0	82.0	0.0	90.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0
Termidor Foam TC 335	0.005	77.0	0.0	87.5	0.0	94.0	0.0	94.5	0.0	95.5	0.0	100.0	0.0
UTC	-	5.5	0.0	7.5	0.0	7.5	0.0	7.5	0.0	7.5	0.0	7.5	0.0

Bioassays initiated 26 September 2011

[redacted] Water not easily absorbed by filter paper

[1] Means based on 5 replicates per treatment

[2] Formula code 237- 036; Lab code 237-051; BAS 350 HKI; 0.005% fipronil composition

[3] Formula and Lab code 237-056; BAS 350 HJI; 0.5% fipronil composition

[4] Formula and Lab code 237-048; BAS 350 HLI, 0.005% fipronil composition

NOTE: Intoxification was not defined by the study authors.

STUDY AUTHOR'S CONCLUSIONS

Mean percent mortality of termites exposed indirectly to TC-311 was 93.5% by Day 5.

REVIEWER'S CONCLUSIONS

Control mortality was 7.5% at Day 5 through Day 10, and mean percent mortality of termites indirectly exposed to TC-311 was 93.5% by Day 5 and 100% by Day 10. Using Abbott's Formula, mean percent mortality of the treated group on Day 5, corrected for control mortality is:

$$\frac{93.5\% \text{ (treated)} - 7.5\% \text{ (control mortality)}}{[100 - 7.5\% \text{ (control mortality)}]} \times 100 = 93\%$$

Data support the conclusions of the study author.

REVIEWER'S RECOMMENDATIONS

Acceptable. Data can be used to support a label claim that the TC-311 kills eastern subterranean termites (*Reticulitermes flavipes*).

TASK 2 DATA EVALUATION RECORD

STUDY TYPE: Product Performance

MRID 486809-04. Lee, M.D. 2011. Efficacy Evaluation of Selected Insecticide Products on *Incisitermes minor* (Hagen) (Western Drywood Termite) in a Choice Laboratory Bioassay.

OCSPP 810.3500 [Premises Treatments]
OCSPP 810.3600 [Structural Treatments]

Product Name: TC-311

EPA Reg. No.: 499-LAU

Decision number: 459860

DP number: 400655

Prepared for
Registration Division (7505)
Office of Pesticide Programs
U.S. Environmental Protection Agency
Washington, DC 20460

Prepared by
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Task Order No.: 2-61

Primary Reviewer:
Dennis M. Opresko, Ph.D.

Signature: [signature]
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Secondary Reviewers:
Robert Ross, M.S.

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Robert H. Ross, M.S. Program Manager

Signature: Robert H. Ross
Date: JUL 10 2012

Quality Assurance:
Angela Edmonds, B.S.

Signature: Angela Edmonds
Date: JUL 10 2012

Disclaimer

This review may have been altered subsequent to the contractors' signatures above.
Summitec Corp. for the U.S. Environmental Protection Agency under Contract No. EP-W-11-014

DATA EVALUATION RECORD

[EPA Primary Reviewer's Name]

STUDY TYPE:	PRODUCT PERFORMANCE [OCSPP 810.3500; 810.3600]
MRID:	486809-04. Efficacy Evaluation of Selected Insecticide Products on *Incisitermes minor* (Hagen) (Western Drywood Termite) in a Choice Laboratory Bioassy. Lee, M.D. 2011.
DP BARCODE:	400655
DECISION NO:	459860
SUBMISSION NO:	910076
SPONSOR:	BASF Corporation
TESTING FACILITY:	Entomology Consultants, LLC, 598 Canyon Point Road, Las Cruces, NM 88011.
STUDY DIRECTOR:	M. D. Lee, Entomology Consultants, LLC.
SUBMITTER:	D.M. Thomas, BASF Corporation
STUDY COMPLETED:	11/09/2011
CONFIDENTIALITY CLAIMS:	None
GOOD LABORATORY PRACTICE:	"This study was not conducted in compliance with Good Laboratory Practice standards as described by EPA (40 CFR Parts 160 and 792), and was never intended for that purpose."
TEST MATERIAL:	PRODUCT NAME: TC-311 EPA REGISTRATION NUMBER: 499-LAU ACTIVE INGREDIENT NAME: Fipronil CHEMICAL NAME: [5-amino-1-(2,6-dichloro-4-(trifluoromethyl)phenyl)-4-((1,R,S)-(trifluoromethyl)sulfinyl)-1-H-pyrazole-3-carbonitrile] A.I. %: 0.005% PC CODE: 129121 CAS NO.: 120068-37-3 FORMULATION TYPE: Dry pressurized insecticide PRODUCT APPLICATION RATE(S): Not quantified.

	ACTIVE INGREDIENT APPLICATION RATE(S): Not reported
PROPOSED LABEL MARKETING CLAIMS:	"Kills termites (including subterranean, drywood, dampwood, and arboreal)…"

STUDY REVIEW

Purpose: To determine the efficacy of insecticide ready-to-use pressurized formulations containing selected active ingredients on drywood termites using a standardized laboratory testing procedure.

MATERIALS AND METHODS

Test Location: Las Cruces, NM

Test Material(s): BAS 350 HL I (formula code 237-048, pressurized foam); BAS 350 HKI (formula code 237-036, pressurized dry); BAS 350 HJI (formula code 235-056, non-pressurized dry). The active ingredient in the tested substances were not identified in the study report. Information supplied in MRID 486809-06 indicates that BAS 350 HK I is equivalent to TC-311 and contains 0.005% fipronil; therefore, it is considered identical to the substance listed under EPA Reg. No. 499-LAU.

Test Species Name, Life Stage, Sex and Age: Western drywood termites (*Incisitermes minor*), field collected in Mesilla, NM; four individual colonies.

Describe test containers, chambers and/or apparatus (include site description and location) and how experiment was conducted: Choice bioassay chambers were constructed using spruce, 3.5 x 3.5 (2 in x 2 in) dimensional lumber that was free of cracks, checks and sap. The wood was cut into blocks measuring 3.5 x 1.6 x 27.5 cm. A channel, approximately 1.15 cm wide x 0.4 cm deep x 25 cm long was cut along one 3.5 cm face of each block using a hemispherical router bit. The channel terminated before either end of the block. The blocks were then cut in half (perpendicular to the long face of the wood) with each half numbered in order to be rejoined after the treatments were applied. One half of each block was prepared to house termites during the acclimation period, while the corresponding half was prepared for randomly assigned treatments. Plexiglass panels measuring 3.5 x 27.5 x 0.25 cm were cut and secured to the top halves to house the termites during acclimation. A second Plexiglass panel measuring 3.5 x 15 x 0.25 cm was cut and fastened to the bottom side of the half to house the termites. This panel was placed so that approximately one half of the length extended past the end of the channel opening and secured. Twenty drywood termite nymphs (at least third instar) were inserted into the open chamber end of each block. Pieces of Handi Tak® were used to temporarily seal the termites in the chamber. An acclimation period of three days was conducted to ensure survivability of the insects.

The chamber halves scheduled to be treated with BAS 350 HK I was covered with a piece of Plexiglass, 3.5 x 13.75 x 0.25 cm. BAS 350 HK I was applied by holding the can actuator down approximately 2 seconds, wirth excess exiting the open end of the channel. The chamber receiving

water only as a treatment was conducted by using a 10 cc syringe, made through a hole in the Plexiglass cover as previously described, applying water into the chamber to the point of run-off. All treated chambers were allowed to dry for 24 hr before introducing the termites.

Following the acclimation period, the Handi Tak seal was removed from each channel housing the termites. The treated halves of the bioassay chambers were quickly slipped into place with their corresponding half. Chamber halves were taped into place after aligning the channels. Chambers were placed on a shelf inside a treatment room in their horizontal position. Daily counts of live and dead nymphs were recorded until 100% mortality was reached or up to 28 days after treatment.

List the treatments including untreated control: The amount of dry pressurized BAS HK I applied to the wood chamber was not quantified. The treatment consisted of a 3-sec spray. Controls received a treatment with water alone.

Number of replicates per treatment: 4.

Number of individuals per replicate: 20.

Length of exposure to treatment: Continuous, for up to 13 days.

Were tested specimens transferred to clean containers? N/A

Experimental conditions: 85 ±3°F with a 12:12 photoperiod. Humidity not reported.

Data or endpoints collected/recorded: Daily counts of live and dead nymphs were recorded.

Data analysis. Collected mean percent mortalities analyzed by ANOVA and general linear model (SAS Institute, 1989) with means separated using Student-Newman-Keuls test at $P<0.05$.

RESULTS

Results for each replicate were not presented in the study report. There were no reported protocol amendments or deviations. Data were not corrected using Abbott's Formula. Summary results for BASF 350 HK I (TC-311; label formulation) are shown in Table 1, together with the results for the other materials tested and the controls.

Table 1: Mean[1] percent mortality of termites per bioassay chamber at specific days after treatment.

TREATMENT	DAYS AFTER TREATMENT								
	1	2	3	4	5	6	7	8	9
BAS 350 HKI Form. Code: 237-036	0.0	0.0	0.0	2.5 b	92.5 b	100.0 a	100.0 a	100.0 a	100.0 a
BAS 350 HL I Form Code: 237-048	0.0	0.0	0.0	0.0 b	0.0 c	0.0 b	0.0 b	0.0 b	0.0 b
BAS 350 HJ I Form Code: 235-056	0.0	0.0	0.0	85.0 a	100.0 a	100.0 a	100.0 a	100.0 a	100.0 a
PREMISE FOAM	0.0	0.0	0.0	0.0 b	0.0 c	0.0 b	0.0 b	0.0 b	0.0 b
WATER CONTROL	0.0	0.0	0.0	0.0 b	0.0 c	0.0 b	0.0 b	0.0 b	0.0 b
F value	--	--	--	139.87	347.81	Infty	Infty	Infty	Infty
Significance Level[3]	--	--	--	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001

Table 1 continued: Mean[1] percent mortality of termites per bioassay chamber at specific days after treatment.

TREATMENT	DAYS AFTER TREATMENT			
	10	11	12	13
BAS 350 HKI Form. Code: 237-036	100.0 a	100.0a	100.0 a	100.0 a
BAS 350 HL I Form Code: 237-048	0.0 b	93.75 a	100.0 a	100.0 a
BAS 350 HJ I Form. Code: 235-056	100.0 a	100.0 a	100.0 a	100.0 a
PREMISE FOAM	0.0 b	8.75 b	85.0 b	100.0 a
WATER CONTROL	0.0 b	0.0 b	0.0 c	0.0 b
F value	Infty	150.87	260.31	Infty
Significance Level[3]	0.0001	0.0001	0.0001	0.0001

1. Each mean based on a total of 80 individual termites (20 termites per bioassay chamber x 4 replications).
2. Letters following each mean represent significant differences based on Student-Newman-Kuels means separation test (P<0.05)
3. ANOV model

STUDY AUTHOR'S CONCLUSIONS

None

REVIEWER'S CONCLUSIONS

Control mortality was zero at all time intervals up to 13 days. Mean percent mortality of the group treated with BAS 350 HK I was zero up to Day 3; 2.5% on Day 4, and 92.5% on Day 5 and 100% thereafter. No information was provided as to the location of the termites (i.e., in the treated or untreated chamber) during the course of the 13-day test period.

TASK 2 DATA EVALUATION RECORD

STUDY TYPE: Product Performance

MRID 486809-05. Jones, C.E. 2011. Bioactivity of Termidor Dry Pressurized (TC-311, 0.005% Fipronil), Termidor Dry (TC-328, BAS 350 HJ I, 0.5% Fipronil) and Termidor Foam (TC-335, 0.005% Fipronil) Against Eastern Subterranean Termites (*Reticulitermes flavipes*) Via Direct Contact Assays (DIMeS 1886a).

OCSPP 810.3500 [Premises Treatments]
OCSPP 810.3600 [Structural Treatments]

Product Name: TC-311

EPA Reg. No.: 499-LAU

Decision number: 459860

DP number: 400655

Prepared for
Registration Division (7505)
Office of Pesticide Programs
U.S. Environmental Protection Agency
Washington, DC 20460

Prepared by
Summitec Corporation
Task Order No.: 2-61

Primary Reviewer:
Dennis M. Opresko, Ph.D.

Signature: [signature]
Date: JUL 10 2012

Secondary Reviewers:
Robert Ross, M.S.

Signature: Robert H. Ross
Date: JUL 10 2012

Robert H. Ross, M.S. Program Manager

Signature: Robert H. Ross
Date: JUL 10 2012

Quality Assurance:
Angela Edmonds, B.S.

Signature: Angela Edmonds
Date: JUL 10 2012

Disclaimer

This review may have been altered subsequent to the contractors' signatures above.
Summitec Corp. for the U.S. Environmental Protection Agency under Contract No. EP-W-11-014

DATA EVALUATION RECORD

[EPA Primary Reviewer's Name]

STUDY TYPE:	PRODUCT PERFORMANCE [OCSPP 810.3500; 810.3600]
MRID:	486809-05. Bioactivity of Termidor Dry Pressurized (TC-335, 0.005% Fipronil), Termidor Dry (TC-328, BAS 350 HJ I, 0.5% Fipronil) and Termidor Foam (TC-335, 0.005% Fipronil) Against Eastern Termites (*Reticulitermes flavipes*) Via Direct Contact Assays (DIMeS 1886a). Jones, C.E. 2011.
DP BARCODE:	400655
DECISION NO:	459860
SUBMISSION NO:	910076
SPONSOR:	BASF Corporation.
TESTING FACILITY:	APR/IB Advanced Testing II, Non-crop.
STUDY DIRECTOR:	S. Thompson, Ph.D., APR/IB Advanced Testing II, Non-crop.
SUBMITTER:	D.M. Thomas, BASF Corporation
STUDY COMPLETED:	31/07/2011
CONFIDENTIALITY CLAIMS:	None
GOOD LABORATORY PRACTICE:	"This study was not conducted in compliance with Good Laboratory Practice standards as described by EPA (40 CFR Parts 160 and 792), and was never intended for that purpose."
TEST MATERIAL:	PRODUCT NAME: TC-311 EPA REGISTRATION NUMBER: 499-LAU ACTIVE INGREDIENT NAME: Fipronil CHEMICAL NAME: [5-amino-1-(2,6-dichloro-4-(trifluoromethyl)phenyl)-4-((1,R,S)-(trifluoromethyl)sulfinyl)-1-H-pyrazole-3-carbonitrile] A.I. %: 0.005% PC CODE: 129121

CAS NO.: 120068-37-3
FORMULATION TYPE: Dry pressurized insecticide
PRODUCT APPLICATION RATE(S): Not quantified.
ACTIVE INGREDIENT APPLICATION RATE(S): Not reported

PROPOSED LABEL MARKETING CLAIMS: "Kills termites (including subterranean, drywood, dampwood, and arboreal)..."

STUDY REVIEW

Purpose: To evaluate the efficacy of Termidor® Dry Pressurized (TC-311, 0.005% Fipronil), Termidor® Dry (TC-328, BAS 350 HJ I, 0.5% Fipronil) and Termidor® Foam (TC-335, 0.005% Fipronil) against eastern subterranean termites (*Reticulitermes flavipes*) via direct contact assays.

MATERIALS AND METHODS

Test Location: Not reported.

Test Material(s): Termidor® Foam (TC-335; 0.005% fipronil,), Termidor® Dry (TC-328, 0.5% fipronil); Termidor® Dry Pressurized insecticide (TC-311, 0.005%). Termidor® Dry Pressurized insecticide (TC-311) is identical to the substance listed under EPA Reg. No. 499-LAU.

Test Species Name, Life Stage, Sex and Age: Eastern termites (*Reticulitermes flavipes*); workers (beyond third instar).

Describe test containers, chambers and/or apparatus (include site description and location) and how experiment was conducted: A single piece of 125 mm diameter Whatman #2 filter paper was placed at the bottom of each 150 x 25 mm Petri dish. TC-311 and blank pressurized treatments were applied evenly from approximately 12 inches above, spraying for 1 second. Petri dishes were weighed before and after spraying. After treatment the lids were replaced and the covered Petri dishes were kept in a fume hood at ambient laboratory temperatures for 24 hr. After 24 hr the lids were removed and the treatments were allowed to dry for at least an additional 24 hr. After drying, 40 worker termites (beyond third instar) were placed in the center of each dish and the dishes were maintained at 26°C and 80% RH in a darkened incubator, except during evaluation. Moisture was replenished as needed. Mortality and intoxication were assessed at 1, 2, 4, 8, 24 and 72 hours.

List the treatments including untreated control (express application rate as g/m^2): Average amount of TC-311 dispensed across the 5 replicates was 0.10 g. Controls were "dry pressurized blanks."

Number of replicates per treatment: 5.

Number of individuals per replicate: 40.

Length of exposure to treatment (time in seconds, minutes or hours): Up to 72 hours.

Were tested specimens transferred to clean containers? No.

Experimental conditions (state relative humidity, temperature, and photoperiod): 26°C and 80% RH in a darkened incubator.

Data or endpoints collected/recorded: Number dead and intoxicated.

Data analysis: Mean percent mortality and mean percent intoxicated. No other data analysis.

RESULTS

Replicate data are included in the study report. There was no mention of protocol amendments or deviations. Data were not corrected using Abbott's Formula. Summary results for Termidor® Dry pressurized insecticide (TC-311; label formulation) are shown in Table 1, together with the results for the other products tested and the controls.

Table 1. Bioactivity of Termidor® Dry and Foam Formulations on Subterranean termites (*R. flavipes*).

Treatment	Mean % mortality/intoxication at hours after exposure (HAE)[1]											
	1 HAE		2 HAE		4 HAE		8 HAE		24 HAE		72 HAE	
	d-m	intox	d-m	intox	d-m	intox	d-m	intox	d-m	intox	d-m	intox
Termidor Dry pressurized TC-311, 0.005% fipronil[2]	0.0	0.0	0.0	0.5	21.5	0.0	73.5	0.0	94.0	6.0	100.0	0.0
Termidor Dry TC 328, 0.5% fipronil[3]	0.0	0.5	33.5	0.0	76.5	0.0	93.0	0.5	100.0	0.0	100.0	0.0
Termidor Foam TC 335, 0.005% fipronil[4]	0.0	0.0	50.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0
Termidor Foam Blank[5]	0.0	0.0	1.0	0.0	4.5	0.0	8.5	0.0	8.5	0.0	8.5	0.0
Termidor Dry blank[6]	0.0	0.0	0.0	0.0	1.0	0.0	1.0	0.0	2.0	0.0	2.0	0.0
UTC	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.0	2.0	0.0	2.0	0.0

Bioassays initiated 28 July 2011

[1] Means based on 5 replicates per treatment

[2] Formula code 237-036; Lab code 237-051; BAS 350 HKI; 0.005% fipronil disposition

[3] Formula and Lab code 237-056; BAS 350 HJI; 0.5% fipronil disposition

[4] Formula and Lab code 237-048; BAS 350 HLI, 0.005% fipronil disposition

[5] Formula and Lab code 238-039

[6] Formula and Lab code 238-038

NOTE: Intoxification was not defined by the study authors.

STUDY AUTHOR'S CONCLUSIONS

Mean percent mortality of the termites treated with TC-311 was 73.5% by 8 hours, and 100% by 72 hr.

REVIEWER'S CONCLUSIONS

Mortality in the dry blank and the untreated control was 1% at 8 hours and 2% at 72 hr. In the group tested with TC-311, an adequate level of control (>90% mortality) was achieved by 24 hr. The data support the conclusions of the study author.

REVIEWER'S RECOMMENDATIONS

Acceptable. Data can be used to support a label claim that the product kills eastern subterranean termites, *Reticulitermes flavipes*.

TASK 2 DATA EVALUATION RECORD

STUDY TYPE: Product Performance

MRID 486809-06. Jones, C.E. 2011. Bioactivity of Termidor Dry Pressurized (TC-311, 0.005% Fipronil), Termidor Dry (TC-328, BAS 350 HJ I, 0.5% Fipronil) and Termidor Foam (TC-335, 0.005% Fipronil) Against Formosan Subterranean Termites (*Coptotermes formosanus*) Via Direct Contact Assays (DIMeS 1886b).

OCSPP 810.3500 [Premises Treatments]
OCSPP 810.3600 [Structural Treatments]

Product Name: TC-311

EPA Reg. No.: 499-LAU

Decision number: 459860

DP number: 400655

Prepared for
Registration Division (7505)
Office of Pesticide Programs
U.S. Environmental Protection Agency
Washington, DC 20460

Prepared by
Summitec Corporation
Task Order No.: 2-61

Primary Reviewer:
Dennis M. Opresko, Ph.D.

Signature: [signature]
Date: JUL 10 2012

Secondary Reviewers:
Robert Ross, M.S.

Signature: Robert H. Ross
Date: JUL 10 2012

Robert H. Ross, M.S. Program Manager

Signature: Robert H. Ross
Date: JUL 10 2012

Quality Assurance:
Angela Edmonds, B.S.

Signature: Angela Edmonds
Date: JUL 10 2012

Disclaimer

This review may have been altered subsequent to the contractors' signatures above.
Summitec Corp. for the U.S. Environmental Protection Agency under Contract No. EP-W-11-014

DATA EVALUATION RECORD

[EPA Primary Reviewer's Name]

STUDY TYPE:	PRODUCT PERFORMANCE [OCSPP 810.3500; 810.3600]
MRID:	486809-06. Bioactivity of Termidor Dry Pressurized (TC-311, 0.005% Fipronil), Termidor Dry (TC-328, BAS 350 HJ I, 0.5% Fipronil) and Termidor Foam (TC-335, 0.005% Fipronil) Against Formosan Subterranean Termites (*Coptotermes formosanus*) Via Direct Contact Assays (DIMeS 1886b). Jones, C.E. 2011.
DP BARCODE:	400655
DECISION NO:	459860
SUBMISSION NO:	910076
SPONSOR:	BASF Corporation.
TESTING FACILITY:	APR/IB Advanced Testing II, Non-crop.
STUDY DIRECTOR:	S. Thompson, Ph.D., APR/IB Advanced Tsting II, Non-crop.
SUBMITTER:	D.M. Thomas, BASF Corporation
STUDY COMPLETED:	30/07/2011
CONFIDENTIALITY CLAIMS:	None
GOOD LABORATORY PRACTICE:	"This study was not conducted in compliance with Good Laboratory Practice standards as described by EPA (40 CFR Parts 160 and 792), and was never intended for that purpose."
TEST MATERIAL:	PRODUCT NAME: TC-311 EPA REGISTRATION NUMBER: 499-LAU ACTIVE INGREDIENT NAME: Fipronil CHEMICAL NAME: [5-amino-1-(2,6-dichloro-4-(trifluoromethyl)phenyl)-4-((1,R,S)-(trifluoromethyl)sulfinyl)-1-H-pyrazole-3-carbonitrile] A.I. %: 0.005% PC CODE: 129121

CAS NO.: 120068-37-3
FORMULATION TYPE: Dry pressurized insecticide.
PRODUCT APPLICATION RATE(S): Not quantified.
ACTIVE INGREDIENT APPLICATION RATE(S): Not reported

PROPOSED LABEL MARKETING CLAIMS: "Kills termites (including subterranean, drywood, dampwood, and arboreal)…"

STUDY REVIEW

Purpose: To evaluate the efficacy of Termidor® Dry Pressurized (TC-311, 0.005% fipronil), Termidor® Dry (TC-328, BAS 350 HJ I, 0.5% fipronil) and Termidor® Foam (TC-335, 0.005% fipronil) against Formosan subterranean termites (*Coptotermes formosanus*) via direct contact assays.

MATERIALS AND METHODS

Test Location: Not reported.

Test Material(s): Termidor® Foam (TC-335; 0.005% fipronil,), Termidor® Dry (TC-328, 0.5% fipronil); Termidor® Dry Pressurized insecticide (TC-311, 0.005%). TC-311 is identical to the substance listed under EPA Reg. 499-LAU.

Test Species Name, Life Stage, Sex and Age: Formosan subterranean termites (*Coptotermes formosanus*), workers (beyond third instar).

Describe test containers, chambers and/or apparatus (include site description and location) and how experiment was conducted: The treatments were conducted in Petri dishes (150 x 25 mm). A single piece of 125 mm diameter Whatman #2 filter paper was placed at the bottom of each Petri dish. TC-311 and a blank pressurized dry treatment were applied evenly from approximately 12 inches above, spraying for 1 second. Petri dishes were weighed before and after spraying. After treatment the lids were replaced and the covered Petri dishes were kept in a fume hood at ambient laboratory temperatures for 24 hr. After 24 hr, the lids were removed and the treatments were allowed to dry for at least an additional 24 hr. After drying, 40 worker termites (beyond third instar) were placed in the center of each dish and the dishes were maintained at 26°C and 80% RH in a darkened incubator, except during evaluation. Moisture was replenished as needed. Mortality and intoxication were assessed at 1, 2, 4, 8, 24 and 72 hours.

List the treatments including untreated control (express application rate as g/m^2): Average amount of TC-311 dispensed across the 5 replicates was 0.13 g. Controls were "dry pressurized blanks" and untreated groups.

Number of replicates per treatment: 5.

Number of individuals per replicate: 40.

Length of exposure to treatment (time in seconds, minutes or hours): Up to 72 hours.

Were tested specimens transferred to clean containers? No.

Experimental conditions (state relative humidity, temperature, and photoperiod): 26°C and 80% RH in a darkened incubator.

Data or endpoints collected/recorded: Number dead and intoxicated.

Data analysis: Mean percent mortality and mean percent intoxicated. No other data analysis.

RESULTS

Replicate data are included in the study report. There was no mention of protocol amendments or deviations. Data were not corrected using Abbott's Formula. Summary results for Termidor® Dry pressurized insecticide (TC-311; label formulation) are shown in Table 1, together with the results for the other products tested and the controls.

Table 1. Bioactivity of Termidor® Dry and Foam Formulations on Subterranean Termites (*C. formosanus*).

	Mean % mortality intoxication at hours after exposure (HAE)[1]											
	1 HAE		2 HAE		4 HAE		8 HAE		24 HAE		72 HAE	
Treatment	d-m	intox	d-m	intox	d-m	intox	d-m	intox	d-m	intox	d-m	intox
Termidor Dry pressurized TC-311 0.005% fipronil[2]	0.0	0.0	0.0	0.0	8.5	1.5	76.5	1.0	99.5	0.5	100.0	0.0
Termidor Dry TC 328, 0.5% fipronil[3]	0.0	0.5	7.5	1.0	74.5	3.5	95.0	0.0	100.0	0.0	100.0	0.0
Termidor Foam TC 335, 0.005% fipronil[4]	2.5	0.0	4.0	24.5	92.0	3.5	99.0	1.0	100.0	0.0	100.0	0.0
Termidor Foam Blank[5]	1.5	0.0	1.5	0.0	2.0	0.0	2.0	0.0	4.5	0.0	6.5	0.0
Termidor Dry blank[6]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.0	2.0	0.0
UTC	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.0	1.5	0.0

Bioassays initiated 27 July 2011

[1] Means based on 5 replicates per treatment

[2] Formula code 237- 036; Lab code 237-051; BAS 350 HKI; 0.005% fipronil disposition

[3] Formula and Lab code 237-056; BAS 350 HJI; 0.5% fipronil disposition

[4] Formula and Lab code 237-048; BAS 350 HLI, 0.005% fipronil disposition

[5] Formula and Lab code 238-039

[6] Formula and Lab code 238-033

NOTE: Intoxification was not defined by the study authors.

STUDY AUTHOR'S CONCLUSIONS

Mean percent mortality of termites treated with TC-311 was 76.5% by 8 hours and 100% by 72 hours.

REVIEWER'S CONCLUSIONS

Mean percent mortality in the two control groups was 0% at 8 hours; at 72 hr it was 2% in the dry pressurized blank and 1.5% in the untreated groups. In the groups treated with TC-311, an adequate level of mortality (>90%) was reached at 24 hours. The data support the conclusions of the study author.

REVIEWER'S RECOMMENDATIONS

Acceptable. Data can be used to support a label claim that the product kills Formosan subterranean termites (*Coptotermes formosanus*).

TASK 2 DATA EVALUATION RECORD

STUDY TYPE: Product Performance

MRID 486810-02. Hansen, L.D. 2011. Bioactivity of Termidor Foam (BAS 350 HL I, TC-335, 0.005% Fipronil) Against Carpenter Ants (*C. modoc)* Via Choice Assay.

OCSPP 810.3500 [Premises Treatments]
OCSPP 810.3600 [Structural Treatments]

Product Name: TC-335

EPA Reg. No.: 499-LAG

Decision number: 459858

DP number: 400663

Prepared for
Registration Division (7505)
Office of Pesticide Programs
U.S. Environmental Protection Agency
Washington, DC 20460

Prepared by
Summitec Corporation
Task Order No.: 2-62

Primary Reviewer:
Dennis M. Opresko, Ph.D.

Signature: [signature]
Date: JUL 10 2012

Secondary Reviewers:
Gene Burgess, Ph.D.

Signature: Gene Burgess, AE
Date: JUL 10 2012

Robert H. Ross, M.S. Program Manager

Signature: Robert H. Ross
Date: JUL 10 2012

Quality Assurance:
Jennifer Goldberg, B.S.

Signature: [signature]
Date: JUL 10 2012

Disclaimer

This review may have been altered subsequent to the contractors' signatures above.
Summitec Corp. for the U.S. Environmental Protection Agency under Contract No. EP-W-11-014

DATA EVALUATION RECORD

[EPA Primary Reviewer's Name]

STUDY TYPE:	PRODUCT PERFORMANCE [OCSPP 810.3500; 810.3600]
MRID:	486810-02. Bioactivity of Termidor Foam (BAS 350 HL I, TC-335, 0.005% fipronil) Against Carpenter Ants (*C. modoc)* Via Choice Assay. Hansen, L.D. 2011.
DP BARCODE:	400663
DECISION NO:	459858
SUBMISSION NO:	910069
SPONSOR:	BASF Corporation
TESTING FACILITY:	Biology Department, Spokane Falls Community College, Spokane, WA.
STUDY DIRECTOR:	L.D. Hansen, Ph.D., Spokane Falls Community College
SUBMITTER:	D.M. Thomas, BASF Corporation
STUDY COMPLETED:	10/08/2011
CONFIDENTIALITY CLAIMS:	None
GOOD LABORATORY PRACTICE:	"This study was not conducted in compliance with Good Laboratory Practice standards as described by EPA (40 CFR Parts 160 and 792), and was never intended for that purpose."
TEST MATERIAL: [As noted on label]	PRODUCT NAME: TC-335 EPA REGISTRATION NUMBER: 499-LAG ACTIVE INGREDIENT NAME: Fipronil CHEMICAL NAME: [5-amino-1-(2,6-dichloro-4-(trifluoromethyl)phenyl)-4-((1,R,S)-(trifluoromethyl)sulfinyl)-1-H-pyrazole-3-carbonitrile] A.I. %: 0.005% PC CODE: 129121 CAS NO.: 120068-37-3 FORMULATION TYPE: Pressurized foam PRODUCT APPLICATION RATE(S): "Foam up to 6" length of trail".

ACTIVE INGREDIENT APPLICATION RATE(S): Not reported

PROPOSED LABEL MARKETING CLAIMS: "Kills… ants (including…*foraging* Carpenter…"

STUDY REVIEW

Purpose: To determine the efficacy of Termidor® Foam (BAS 350 HL I, TC-335) against carpenter ants (*C. modoc*) in a choice assay.

MATERIALS AND METHODS

Test Location: Spokane, WA

Test Material(s): Termidor® foam (0.0050% fipronil, TC-335), Premise foam (imidacloprid), and an untreated control. Termidor® foam (TC-335) is identical to the substance listed under EPA Reg. No. 499-LAG.

Test Species Name, Life Stage, Sex and Age: Carpenter ant (*Camponotus modoc*), workers; collected in north Idaho; maintained in the lab with a supply of honey, a protein source, and water.

Describe test containers, chambers and/or apparatus (include site description and location) and how experiment was conducted: Wood substrates were cut into pieces approximately 13 by 11 by 1.75 cm in size. Substrates were covered with the foam and allowed to dry for 24 hr before the process was repeated for the opposite side of each substrate. Substrates were allowed to dry again for 24 hr before placement into rearing chambers (32 x 20 x 8 cm). Tubes of water and dishes of honey were added to the containers. Approximately 40% of the lids of the containers were removed for ventilation. A mixture of petroleum jelly and mineral oil was applied to the underside of the lid to keep the ants from escaping. On substrates not treated with insecticide, water was sprayed onto the surface to the point of run off and also allowed to dry for 24 hr after each application. Two substrates were placed in each plastic container including one containing a Termidor® Foam substrate and a water substrate, and one containing two water substrates as a control. After 24 hr in the plastic rearing chambers, 50 carpenter ant workers were introduced. Mortality of the ants was assessed at 1, 2, 4, 8, and 24 hr and daily through 14 day.

List the treatments including untreated control: Total amount applied to both sides of the wood substrates for each replicate was 14.5, 13.6, 21.5, 16.4, and 11.5 g of Termidor® Foam. Controls were sprayed with water alone.

Number of replicates per treatment: 5.

Number of individuals per replicate: 50.

Length of exposure to treatment: Up to 14 days.

Were tested specimens transferred to clean containers? No.

Experimental conditions: Not reported.

Data or endpoints collected/recorded: Number of dead ants and percent mortality at each observation period.

Data analysis: Percent mortality. No other data analysis.

RESULTS

Results for each replicate were presented in the study report. There were no reported protocol amendments or deviations. Data were not corrected using Abbott's Formula, nor were they subjected to statistical analysis. Results are shown in Table 1.

Table 1. Mortality of *C. modoc* When Exposed to Wood Substrates Treated with Termidor® Foam

			Mortality																	
Treatment	Rep	No.	1 hr	2 hr	4 hr	8 hr	24 hr	2D	3D	4D	5D	6D	7D	8D	9D	10D	11D	12D	13D	14D
Termidor & Water	1	52	1	1	5	9	15	50	52	52	52	52	52	52	52	52	52	52	52	52
	2	51	2	3	5	10	14	49	51	51	51	51	51	51	51	51	51	51	51	51
	3	51	1	3	8	10	13	49	51	51	51	51	51	51	51	51	51	51	51	51
	4	53	2	4	6	7	13	50	53	53	53	53	53	53	53	53	53	53	53	53
	5	50	1	1	2	2	4	35	50	50	50	50	50	50	50	50	50	50	50	50
Total		257	7	12	26	38	59	233	257	257	257	257	257	257	257	257	257	257	257	257
%			3	5	10	15	23	91	100	100	100	100	100	100	100	100	100	100	100	100
Water & water	1	41	1	1	1	1	1	1	1	1	1	1	1	3	3	4	5	6	6	6
	2	52	2	2	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4
	3	53	0	0	0	1	1	2	2	2	2	2	2	3	3	3	3	4	4	4
	4	53	2	2	2	3	3	4	4	4	4	4	4	4	5	5	5	5	5	5
	5	51	1	1	2	2	2	2	2	2	2	2	2	2	2	2	2	3	4	4
Total		250	6	6	9	11	11	13	13	13	13	13	13	16	17	18	19	22	23	23
%			2	2	4	4	4	5	5	5	5	5	5	6	7	7	8	9	9	9

STUDY AUTHOR'S CONCLUSIONS

Mortality was 91% by Day 2 and 100% by Day 3. Ants were not repelled by Termidor® Foam.

REVIEWER'S CONCLUSIONS

Control mortality was 5% by Day 2 and mean percent mortality of the treated group was 91%. Using Abbott's Formula, mean percent mortality of the treated group on Day 2 corrected for control mortality is:

$$\frac{91\% \text{ (treated)} - 5\% \text{ (control mortality)}}{[100 - 5\% \text{ (control mortality)}]} \times 100 = 90.5\%$$

Data support the conclusions of the study author.

REVIEWER'S RECOMMENDATIONS

Acceptable. Data can be used to support a label claim that the product kills carpenter ants (*Camponotus modoc*).

TASK 2 DATA EVALUATION RECORD

STUDY TYPE: Product Performance

MRID 486810-03 Suiter, D.R. 2011. Bioactivity of Termidor Foam (BAS 350 HL I, TC-335, 0.005% Fipronil) Against Carpenter Ants (*C. pennsylvanicus*) Via Artificial Nests.

OCSPP 810.3500 [Premises Treatments]
OCSPP 810.3600 [Structural Treatments]

Product Name: TC-335

EPA Reg. No.: 499-LAG

Decision number: 459858

DP number: 400663

Prepared for
Registration Division (7505)
Office of Pesticide Programs
U.S. Environmental Protection Agency
Washington, DC 20460

Prepared by
Summitec Corporation
Task Order No.: 2-62

Primary Reviewer:
Dennis M. Opresko, Ph.D.

Signature: [signature]
Date: JUL 10 2012

Secondary Reviewers:
Gene Burgess, Ph.D.

Signature: Gene Burgess, AE
Date: JUL 10 2012

Robert H. Ross, M.S. Program Manager

Signature: Robert H Ross
Date: JUL 10 2012

Quality Assurance:
Jennifer Goldberg, B.S.

Signature: [signature]
Date: JUL 10 JUL 10 2012

Disclaimer

This review may have been altered subsequent to the contractors' signatures above.
Summitec Corp. for the U.S. Environmental Protection Agency under Contract No. EP-W-11-014

DATA EVALUATION RECORD

[EPA Primary Reviewer's Name]

STUDY TYPE:	PRODUCT PERFORMANCE [OCSPP 810.3500; 810.3600]
MRID:	486810-03. Bioactivity of Termidor Foam (BAS 350 HL I, TC-335, 0.005% Fipronil) Against Carpenter Ants (*C. pennsylvanicus*) Via Artificial Nests. Suiter, D.R. 2011.
DP BARCODE:	400663
DECISION NO:	459858
SUBMISSION NO:	910069
SPONSOR:	BASF Corporation.
TESTING FACILITY:	University of Georgia Griffin Campus of Urban Pest Management Program
STUDY DIRECTOR:	D. R. Suiter, Ph.D., University of Georgia
SUBMITTER:	D.M. Thomas, BASF Corporation
STUDY COMPLETED:	09/08/2011
CONFIDENTIALITY CLAIMS:	None
GOOD LABORATORY PRACTICE:	"This study was not conducted in compliance with Good Laboratory Practice standards as described by EPA (40 CFR Parts 160 and 792), and was never intended for that purpose."
TEST MATERIAL: [As noted on label]	PRODUCT NAME: TC-335 EPA REGISTRATION NUMBER: 499-LAG ACTIVE INGREDIENT NAME: Fipronil CHEMICAL NAME: [5-amino-1-(2,6-dichloro-4-(trifluoromethyl)phenyl)-4-((1,R,S)-(trifluoromethyl)sulfinyl)-1-H-pyrazole-3-carbonitrile] A.I. %: 0.005% PC CODE: 129121 CAS NO.: 120068-37-3 FORMULATION TYPE: Foam PRODUCT APPLICATION RATE(S) g/m^2: Foam up to

6" length of trail.
ACTIVE INGREDIENT APPLICATION RATE(S)g/m^2:
Not reported

PROPOSED LABEL MARKETING CLAIMS: "Kills… ants (including…*foraging* Carpenter…"

STUDY REVIEW

Purpose: To determine the efficacy of a fipronil-based foam against the black carpenter ant, *Camponotus pennsylvanicus*.

MATERIALS AND METHODS

Test Location: University of Georgia Griffin Campus, Griffin, GA.

Test Material(s): Termidor® foam (0.005% fipronil, TC-335), Premise foam (0.05% imidacloprid), and an untreated control. Termidor® foam (TC-335) is identical to the substance listed on the product label under EPA Reg. No. 499-LAG.

Test Species Name, Life Stage, Sex and Age: Black carpenter ant (*Camponotus pennsylvanicus*), workers; collected from a single wild colony in Griffin, GA and maintained in Fluon-lined 5 gallon buckets supplied with food water and harborage.

Describe test containers, chambers and/or apparatus (include site description and location) and how experiment was conducted: Artificial carpenter ant nests were constructed from pine 2 x 8s. A nest was a 10 inch long piece of wood with parallel, one-half inch diameter holes drilled lengthwise into the board, but ending just before breaking through the back end (i.e., the holes were drilled approximately 9.5 inches into the 10 inch board). To connect these two parallel galleries a third hole was drilled from one side of the board to the other, perpendicular to and across the path of the parallel galleries. The board was then cut lengthwise down the center, resulting in two galleried pieces of wood that mirrored one another. One half of each block was treated with enough foam to completely coat the inside of all galleries. The sister side was left untreated. The next day, after the foam had dried, masking tape was placed on all outside surfaces. The treated and untreated pairs were put back together on the floor of a Fluon lined plastic box 31 cm deep x 23 cm wide x 10 cm high. Twenty carpenter ants were added to each box. Two days later the number of ants alive and dead/dying inside each block and outside each block but inside the plastic box were determined. Dying ants were defined as those that were twitching, unable to crawl and/or right themselves and/or exhibited an agitated gait with legs spread eagle fashion with open jaws.

List the treatments including untreated control: Not quantified.

Number of replicates per treatment: 5.

Number of individuals per replicate: 20.

Length of exposure to treatment: 2 days.

Were tested specimens transferred to clean containers? No.

Experimental conditions: Not reported.

Data or endpoints collected/recorded: Number of alive, dead and dying ants.

Data analysis: Mean percent distributions were reported. No other data analysis.

RESULTS

Neither raw data nor the study protocol was included in the study report. There was no mention of protocol amendments or deviations. Data were not corrected using Abbott's Formula nor were they subjected to statistical analysis. Results are shown in Table 1.

Table 1. Mean percent distribution (n = 5 replicates per mean; 20 ants per replicate) of live and dead/dying carpenter ants in experimental arenas two days after being exposed to a one-day old Termidor (fipronil) or Premise (imidacloprid) foam-treated wood block in a choice test.

	Percent Dead/Dying			Percent Alive		
Treatment	InTrtdBlock	InUnTrtdBlock	InPlasticBox	InTrtdBlock	InUnTrtdBlock	InPlasticBox
Control	0	0	2	22	66	10
Premise	0	0	1	5	93	1
Termidor	2	3	92	0	3	0

In the Termidor® Foam tests 92% of the ants were found in the plastic container outside the blocks of wood.

STUDY AUTHOR'S CONCLUSIONS

On average, 97% of the ants in each replicate were dead or dying at the end of the two day test. Control mortality was 2%.

REVIEWER'S CONCLUSIONS

Control mortality was 2%. In the Termidor® Foam tests 97% were identified as dead or dying. The data support the conclusions of the study author. The occurrence of 92% of the ants in the plastic container outside the blocks of wood suggests that the test substance might have acted as a repellent. The study authors attributed this to "enhanced mobility."

REVIEWER'S RECOMMENDATIONS

Acceptable. Data can be used to support a label claim that the product kills black carpenter ants, *Camponotus pennsylvanicus*.